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The FIRST-APM QSOs Survey (FAQS) in the SBS Region. Preliminary Results

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Abstract. The main goal of the FIRST-APM QSO Survey (FAQS) survey is to compile the most complete sample of Bright QSOs, located in the area covered by the Second Byurakan Survey (SBS). Here we report the first results of an ongoing study based on the cross-identification of the FIRST radio catalog and the APM optical catalog. The overlapping sky area between FIRST and SBS is about 700 deg^2. The compiled list of sources for this overlapping region contains $\sim$ 400 quasar candidates brighter than $B = 18\overset{\text{m}}{.}5$. About 90 objects were already spectroscopically classified. During 1999-2000, we observed spectroscopically more than 150 FAQS objects with the 2.1m telescope of the Guillermo Haro Observatory (GHO).We have found 51 new QSOs (4 BAL QSOs), 13 Seyfert Galaxies (5 NLSy1's), 23 emission line galaxies, 3 BL Lac objects and 57 stars.

1. Introduction

Optically selected quasar samples are the most complete ones. However, every survey technique has a redshift and a luminosity-dependent selection biases (Wampler and Ponz 1985). Only the combination of the different search techniques in different spectral ranges, will yield a complete sample of quasars, with an adequate representation of the properties inherent to them (Hartwick & Shade 1990; Chavushyan 1995). We have started a multiwavelength search for QSOs in the well optically investigated SBS sky area. (Stepanian et al. 1999, and references therein).

The FIRST radio survey (Becker et al. 1995) provides a new resource for constructing a large quasar sample. With positions accurate to $1''$ and a point source sensitivity limit of 1 mJy, it goes 50 times fainter in flux than any previous radio survey. The FBQS (Gregg et al. 1996; White et al. 2000) is a QSO survey based on FIRST. Unfortunately, for the FBQS area there is a lack of complete optically selected samples of QSOs. Hence, it is very difficult to estimate the completeness of this latter survey, as well as, the number of missed quasars in the optical FBQS sample.

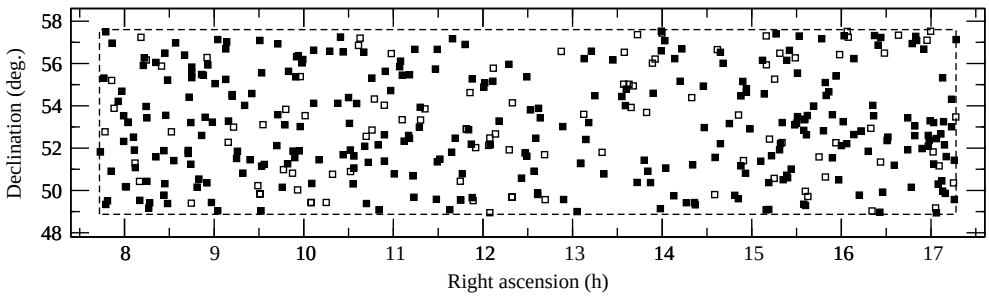

Figure 1. The distribution of the FAQS objects on the sky. Open squares representing new radiosources and filled squares representing the previously known AGNs.

2. Sample

In order to detect the missing QSOs in the SBS, and to create a more complete QSO sample, we have cross-identified the deep radio (FIRST) and optical (APM) databases. The overlap of the surveys is about 700 sq. degree in the sky. We have selected objects classified as stellar-like on APM with B-magnitudes between $14\overset{m}{.}5$ and $18\overset{m}{.}5$ coincident with the positions of the FIRST sources within $3''$ radius. The sources, in this region, are $\sim$ 400 objects, of which 90 were previously known AGNs (discovered mainly by the SBS) (Fig. 1).

3. Observations and preliminary results

The observations were carried out with the 2.1m telescope of the GHO and the LFOSC spectrograph. A set-up covering the spectral range of 4200-9000 Å, with a dispersion of 8 Å/pixel was adopted (Zickgraf et al. 1997). During 1999-2000 period, we have carried out spectroscopic observations for 150 FAQS objects (see examples in Fig.2). So far, in this studied subsample, we have found 51 new QSOs (4 BAL), 13 Seyfert Galaxies (5 NLSy1's), 23 emission line galaxies, 3 BL Lac objects and 57 high galactic latitude stars.

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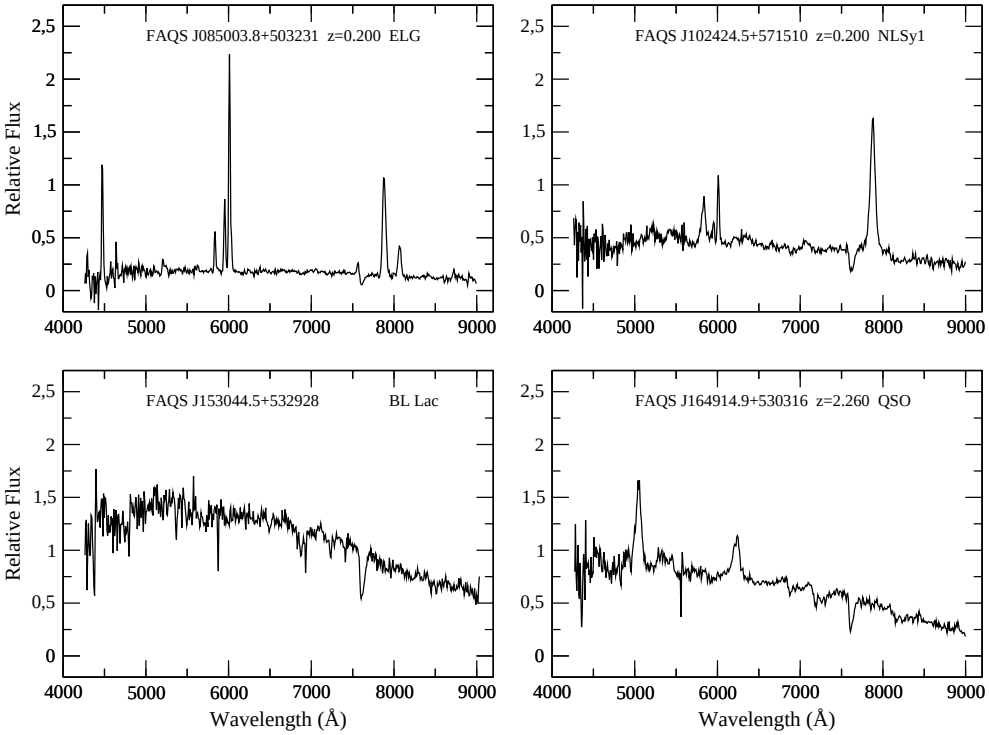

Figure 2. Typical examples of LFOSC spectra of different type of objects contained in the FAQS sample.

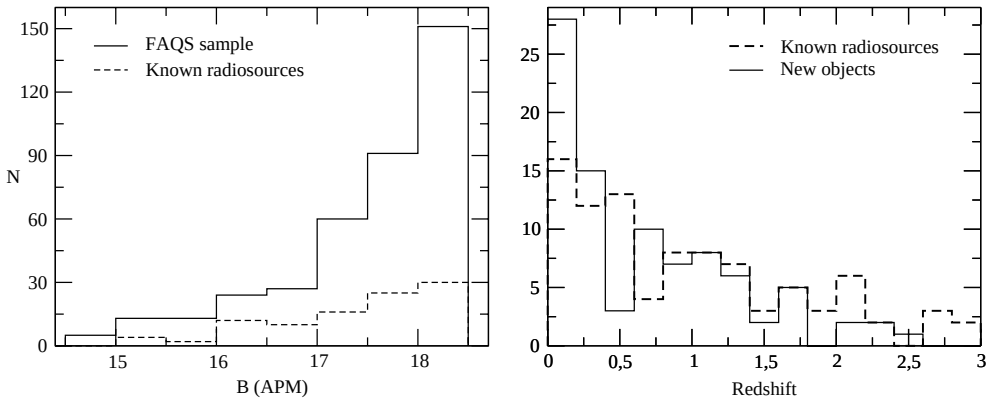

Figure 3. Histograms of the magnitude and redshift distributions for the FAQS sample.